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NASA TECH BRIEF

Improved Alkaline Electrochemical Cell

The problem:

In the conventional rechargeable alkaline electrochemical cell employing a negative zinc electrode, the zinc oxide produced during discharge dissolves in the electrolyte to form zincate ions. During the charging cycle, zinc is plated out from the zincate ions in the form of dendrites, which can cause shorting, inconsistent performance, and early failure of the cell.

The solution:

Addition of lead ions to the electrolyte to suppress zinc dendrite formation during the charging cycle.

How it's done:

A soluble lead salt (e.g., lead nitrate or acetate) can be added directly to the electrolyte to introduce the lead ions, or metallic lead can be incorporated in the zinc electrode and allowed to dissolve (ionize) into the electrolyte. The concentration of lead dissolved in the electrolyte should be in the range of 0.2 to 2.0 grams per liter. Less lead is ineffective in preventing dendrite growth, and more lead results in a mass of nonadherent dendrites containing lead.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland 20771
Reference: B70-10153

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: Harry G. Oswin, James E. Oxley, and Charles W. Fleischmann of Leesona Moos Laboratory under contract to Goddard Space Flight Center (GSC-10792)

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